REMARKS/ARGUMENTS

Claims 1-9 and 11-21 are pending. Claims 1 and 19 have been amended. Claim 21 has been added. No new matter has been added.

Claims 1-20 were rejected under 35 U.S.C. 103(a) as being unpatentable over Tran et al. in view of Fischer et al. Applicants traverse the rejection. Claim 1 is directed to improving the characteristics (e.g., refresh time) of a semiconductor device. The present inventor has discovered that the refresh time of the semiconductor device can be improved by using a buffer layer to implant the dopants to make the plug ion-implantation regions.

The buffer layer enables the implantation energy to be increased. For example, as explained on page 10, lines 9-23, the implantation energy of 40-70 KeV is used to implant the dopants form the plug ion-implantation regions of a given depth if the buffer layer is not provided. However, if the buffer layer is used, the implantation energy can be increased to 80-150 KeV to form the plug ion-implantation regions of substantially the same depth (see Fig. 3). The increased implantation energy provides a rounder and broader dopant profile. That is, the dopants are more evenly distributed in the substrate (page 12, lines 5-16) to provide the semiconductor device with improved characteristics. Accordingly, claim 1 recites, among other features, "wherein the buffer layer is configured to enable a higher implantation energy to be used to implant the second dopants to the given depth, so that a concentration profile of the second dopants has a reduced slope."

Tran et al. does not disclose or teach using the buffer layer to increase the implantation energy. Tran et al. uses the dielectric layer 72 to form the doped region 214 that is shaped to be within the region 204. That is, the dielectric layer is used as a mask. Tran et al. does not disclose or suggest that the use of a buffer layer to increase the implantation energy. Nor does Tran disclose or suggest that the dopants implanted in such a way have more evenly distributed profile. Fischer et al. also does not remedy these deficiencies of Tran. Therefore, claim 1 is allowable at least for these reasons. Claims 2-8 depend from claim 1 and are allowable at least for this reason. Claims 10-18 were previously canceled.

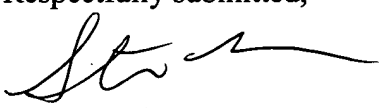
Claim 19 recites, "wherein the buffer layer is configured to enable a higher implantation energy to be used to implant the second dopants to the given depth, so that a concentration profile of the second dopants has a reduced slope." Tran et al. and Fischer et al., alone or in combination, do not disclose or suggest the above features. Claim 19 is allowable at least for this reason. Claim 20 depends from claim 19 and is allowable at least for this reason.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,



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